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in vegetable paleontology will perhaps regard as still more important the discovery and careful characterization of the twenty-eight forms which the author describes as wholly new to science, twenty-six of which receive the rank of species, and for the satisfactory classification of which he has found himself obliged to create the two new extinct genera, *Mertensides* and *Pseudodanaopsis*. Of these twenty-six new species, eight are allied more or less closely to known forms, leaving eighteen species so distinct that the author has been unable to compare them with any thing that has been hitherto described. This is remarkable, in view of the great uniformity which is generally found to exist in the floras of the earlier geological formations at points the most widely separated geographically. It seems to indicate an unexpected divergence of the mesozoic flora of North America from that of Europe and other districts of the eastern hemisphere.

An important feature of the work, not indicated by its title, is a careful revision by Professor Fontaine of the researches in the same line of Dr. Ebenezer Emmons in North Carolina, made some thirty years ago, and published in part vi. of his 'American geology,' 1857. The fossil plants found by Dr. Emmons, and figured in this work, are described under the head of 'Fossils of the trias;' but Professor Fontaine thinks he has conclusively shown, from a study of his figures and descriptions (the fossils themselves having been destroyed during the war), that this 'trias' of Emmons in North Carolina is identical with his 'older mesozoic' of Virginia.

The work is copiously illustrated, there being, in all, fifty-four plates, the last six or seven of which are devoted to the reproduction of the figures of Emmons. The photo-engraving process is employed, and we have here a standard from which to judge of its applicability to the illustration of fossil plants. In some respects it proves quite satisfactory; at least, when we consider its cheapness, and the advantage it thus furnishes of allowing, at moderate cost, the ample illustration of species, which is so great a necessity in this branch of paleontology. But we do not think the most has been made of the process in the present work.

The index, which is otherwise good, contains one feature which cannot be too highly commended to authors of such works. This is the reference to plate and figure, as well as to page; which, in more than half the cases, saves the reader the labor of looking twice.

#### ANNALS OF THE NAVAL OBSERVATORY.

DURING the period covered by the observations contained in these two volumes, the naval observatory was under the superintendency of the late Rear-Admiral Rodgers. His general reports to the chief of the Bureau of navigation, on the work of the institution, were promptly issued in the latter part of the years to which they refer, and are reprinted, as customarily, in the annual volumes.

Pursuant to its policy, inaugurated some five years ago, of reducing the size of its bulky publications,—a policy which has met with universal commendation,—the observatory might now go farther, and expunge a good fraction of the protracted and annually reiterated introduction to the observations with the transit-circle. We seriously question whether disastrous ambiguity would ensue if we were not told, with every year, that the ridge of the roof covering the transit-circle extends east and west; and that the hole in the cube of the axis of the instrument is 2.3 inches in diameter;—to say nothing of the continued reprint of formulae and details of reduction, which every astronomer, who has occasion to consult the volume, keeps constantly in mind. This introduction now occupies about one-fourth of the entire volume, including observations with all the instruments of the establishment, and the several appendices. We suspect, however, that the only sufficient remedy lies, not in excerpption, but in rewriting *ab initio*, on the supposition that those who will read the introduction already know something.

The newly adopted form in which the observations with the transit-circle are published seems to have been very carefully studied, and is in every way a model. We should like to be able to write as strongly of the precision of the results of stellar and planetary observations with this instrument, the character of which is too well known to require characterization here. Presumably, no one is responsible for the fact that they are not better; but certainly the frequent change of observers, unavoidable in so far as the observatory itself is concerned, is not conducive to results of a high order of accuracy.

During the years 1879 and 1880, the transit-circle was under the charge of Professor Eastman, and was employed with customary

*Astronomical and meteorological observations made during the years 1879 and 1880 at the U. S. naval observatory. 2 vols. Washington, Government, 1882-84.*

regularity in observing the stars of the 'American ephemeris,' the sun, moon, and planets, and lists of miscellaneous objects chiefly used by exploration parties and expeditions in determining latitudes. In the choice of dates when observations of the bodies of the solar system, particularly the outer great planets, were made, no systematized plan of operation appears to have been followed. It would be well if the adaptation of the observations to the problems of the future investigator were kept in mind equally prominently with the fact that these bodies, a month or two preceding the opposition-time, transit the meridian at inconvenient hours beyond midnight. The days of observation should be so chosen that it will be possible to derive a series of normal places for each planet symmetrically placed with reference to the epoch of least distance from the earth.

The great equatorial, with Professors Hall and Holden as observers, was mainly occupied with work upon double stars; but the satellites of the outer planets were fully observed, as also the great nebula of Orion, the observations on which were published by Professor Holden several years ago, in his well-known monograph.

There is no record of observations with either the prime vertical transit, the mural circle, or the east transit instrument; and there is very little to show for the lesser equatorial of the observatory. The meteorological observations have been conducted on about the same plan for a long series of years, having been begun long before the Army signal-service was in successful operation as a meteorological bureau. If they are continued on the supposition that they form a valuable addition to meteorology, this would appear to be an insufficient reason; while, for any known practical bearing on astronomy, they are barely worth the making and printing.

The volume of observations for the year 1879 concludes with two appendixes, the latter of which is a determination of the semi-diameter of the moon from occultations of the Pleiades, by Mr. H. M. Paul; and the former, by Professor Hall, on the parallax of  $\alpha$  Lyrae and 61 Cygni. In the appendix to the volume for 1880, Mr. Winlock has so collected all the observations and drawings of the great comet of 1882, made at the naval observatory, as to make them available, in considerable part, for definitive discussion of the comet's orbit.

While, on looking casually through these volumes, one is impressed with the necessity of bestowing greater care on the details of

proof-reading, it is a pleasure to note the sudden influx of new types in the printer's fonts from which the latter part of the volume for 1880 was set, replacing the old types, which had become so much worn as to make scores of figures on many pages quite indecipherable.

With the commencement of the present year, the observatory, under the superintendency of Rear-Admiral Franklin, has begun the execution of a pre-organized plan of astronomical work. This has already been printed and distributed, and the advantages to be expected from this arrangement will be watched for with much interest.

#### BRAIN-EXHAUSTION.

This book belongs to a class which finds circulation only in this country, and is not calculated to establish a foreign reputation for the author. If the time spent upon its preparation had been given to accurate observation or careful experiment, and the results condensed into an article of twenty pages, the author might have secured some attention. The work consists of a mass of theoretical statements regarding normal and abnormal brain-action, few of which have any basis in ascertained facts. We know that brain-exhaustion is possible, and we know under what conditions it occurs. The chapter on causation contains a fair summary of these conditions. We do not know the mechanism of its occurrence, and we cannot affirm, in a given case, that a definite line of treatment will succeed.

The author has a favorite method which it is the object of the book to urge. The method does not commend itself to those who are familiar with recent German investigations by experiment, which, as far as animals go, are directly opposed in their results to the conclusions reached by Dr. Corning. Electrical treatment of brain-disease must be conducted with caution, and only with the aid of an accurate galvanometer which measures the intensity of the current, and enables the physician to know at any moment what strength he is using. Of this, as well as of other necessary precautions, Dr. Corning seems unaware, for he recommends the use of from 'five to fifteen cells,' a wholly unknown quantity.

Science demands facts, not theories; and the sooner this is understood by those who seek a place in its ranks, the better.

*Brain-exhaustion, with some preliminary considerations on cerebral dynamics.* By J. L. CORNING, M.D. New York, Appleton, 1884. 234 p. 16".